

VERSION OF AMENDMENTS SHOWING MARKINGS**In the Specification****Title**

~~BATTERY PART~~ DIE CAST BATTERY TERMINAL AND A METHOD OF MAKING

Page 9, paragraph 5:

Figure 1 shows a battery part 10 comprising a battery terminal having an upward extending lug 11 and a hollow base 12 having a central opening 13 therein. Located around the exterior of battery terminal 10 is a set of bifurcated annular acid rings 15, 16, 17, and 18 that have been formed by a die casting process. That is, a segmented mold (not shown) which radially surrounds the sides of battery part 10 during the casting process has been pulled radially away from the battery part 10 to release the battery part from the mold. Due to the configuration of the battery part and the need to pull the side mold parts radially or laterally away from the terminal the intermediate acid rings 15, 16 and 17 are oftentimes each provided with a slight tapered. Each of the acid rings 15, 16 and 17 have been cast with an annular V shaped groove located in the end of each of the acid rings. The placement of the groove in the end of acid ring generates a bifurcated circumferential end to the acid ring with each of the bifurcated ends including radially extending annular lips which are located along the opposite lateral faces of the acid rings 15, 16 and 17. Thus, a feature of the present invention is a battery terminal wherein the cast battery terminals comprising a bifurcated acid ring 15 with a die cast upper annular lip 15a and a die cast lower annular lip 15b. The end face of each of the acid rings are shown with an interior side surface or a bevel face 15c and interior side surface or a bevel face ~~15b~~ 15d that are

joined at the root of the acid ring to form a V shaped annular groove 15e. Similarly, each of the bifurcated acid rings 16 and 17 have identical lips that form an apex at the root of the lips and a V shaped annular groove on the periphery of the annular acid ring.

Page 10, paragraph 4:

Figure 2 illustrates the battery terminal 10 located in a fluidized bed 20 having particles 21 that impinge on the exterior surfaces or beveled end face of the acid rings 15, 16 and 17 of the battery terminal through the introduction of fluid through lower openings 22. The impingement of the particles, which are preferably harder than the battery part, provide a two-fold effect. The first effect is that the particles impinging the battery part can polish the exterior surface of the battery part. The second effect is that it has been found that the impingement of particles on the beveled end surfaces of the acid ring can causes the lips of annular acid rings to fold over or flare out and create a beveled sealing region or sealing bead much like an O-ring on the lateral face of the acid rings. Thus, a feature of the present invention is that one eliminates the need to form a "hook like" connection between the battery terminal and the battery container or to deform the entire acid ring into a dovetail.

Page 13, paragraph 5:

Figure 7A shows an isolated view of a portion of bifurcated acid ring 51 to reveal in detail the lip 60 with a first face or lateral face 60a on one side and a second face, namely a beveled end face 60d on the other side of lip 60 with the lateral face 60a and the beveled end face 60d forming an included angle of less than 90 degrees therebetween. Similarly, a second lip 61 includes a first face or lateral face 61a on one side and a second face,

namely, a beveled end face 61d on the opposite side with the lateral face 61a and the beveled end face 61d forming an included angle of less than 90 degrees therebetween. In addition, the beveled end face 60d intersects beveled end face 61d at an apex 61e to form a valley or V-shaped groove between the lip 60 on one face of the acid ring and the lip 61 on the opposite face of the acid ring 51. Figure 7A also shows the lateral face 60a intersecting with the beveled end face 60d to form an apex 60f and the lateral face 61a intersects with the beveled end face 61d to form an apex 61f.

Page 14, paragraph 2:

Figure 7B shows acid rings 51, 52 and 52 in a partial view in Figure 7A with the lips in a flared condition to form a lateral sealing region or sealing bead on the lateral faces of the acid rings to thereby enhance the sealing of a battery container to the terminal. The beveled surface 60d of the first lip 60 and the beveled surface 61d of second lip 61 are located at approximately a ninety degree angle to each other although the angle can vary depending on the selection of the angle of the beveled surface for each lip. In the embodiments shown the lips 60 and 61 which were previously in an unflared condition (Figure 7A) and an apex 60f and ~~61~~ 61f have been transformed to a flared condition. The lip 60 has a an extended flat surface 60c and lip 61 has an extended flat surface 61c.

In the Claims

1. (Withdrawn) A die cast battery terminal comprising
a connecting lug;
a base, said base having a plurality of bifurcated acid rings;
a central axis extending through said base; and
each of said bifurcated acid rings having a first lip and a second lip, said first lip
and said second lip each having a beveled side surface converging toward each other to
form a groove therebetween so that radial impingement of a force on the beveled side
surfaces causes a flaring of said lips to form a sealing region on a lateral face of each of
said lips.
2. (Withdrawn) The die cast battery terminal of claim 1 wherein the side surface of
the first lip and the side surface of the second lip form a V-shaped groove.
3. (Withdrawn) The die cast battery terminal of claim 1 wherein the first lip and the
second lip comprise annular lips that extend around the periphery of the acid rings.
4. (Withdrawn) The die cast battery terminal of claim 1 wherein at least one of the
acid rings is molded with an undercut therein to provide a protrusion for engaging a
container.

5. (Withdrawn) The die cast battery terminal of claim 2 wherein the beveled surface of the first lip and the beveled surface of second lip are located at approximately a ninety degree angle to each other.
6. (Currently Amended) ~~The~~ A method of making a battery part comprising:
casting a the battery part with an acid ring with the acid ring having at least one flareable lip having a lateral surface and a beveled surface forming an acute angle with the lateral surface.
7. (Currently Amended) The method of making a ~~batter~~ the battery part of claim 6 including the step of casting a battery terminal with a plurality of annular acid rings each having an annular lip separated by a groove located therebetween; and
placing the battery terminal with the ~~set~~ plurality of annular acid rings each having ~~an~~ annular lip amongst particles that randomly impinge on the side surfaces of the acid rings to flare the lips of the acid rings to thereby form a protrusion for engaging a container.
8. (Original) The method of claim 6 wherein the battery terminal is placed in a fluidized bed with particles having a hardness greater than the hardness of the battery terminal.
9. (Currently Amended) ~~The~~ A method of making a battery terminal comprising the steps of:

forming a plurality of acid rings each having a lip formed by a first lateral surface and a second surface with the first lateral surface and the second surface having an ~~included~~ angle less than 90 degrees.

10. (Original) The method of claim 9 wherein the method of making the battery terminal comprises casting the battery terminal in a mold.

11. (Original) The method of claim 9 including impacting the second surface to flare the lip on the acid ring to form a sealing region on the lateral surface of the lip.

12. (Currently Amended) The method of making a battery terminal of claim 9 including forming a second lip on the acid ring with the second lip having a first lateral surface and a second surface with the first lateral surface and the second surface of the second lip having an ~~included~~ angle less than 90 degrees.

13. (Original) The method of claim 9 including the making of the battery terminal from a lead alloy.

14. (Original) The method of claim 9 including impacting the second surfaces by radially striking the second surface to flare the lip to form a sealing bead on the lateral surface of the lip.

15. (Original) The method of claim 9 wherein the battery terminal is placed in a hopper containing free particles for randomly impinging on the second surface to thereby flare the lip.

16. (Original) The method of claim 9 wherein the second surface is impacted with a radial traveling peening member to thereby flare the lip to form a sealing bead on the lateral surface for engaging a battery container.

17. (Original) The method of claim 12 wherein the second surface of the first lip and the second surface of the second lip are formed into a V-shaped groove.

18. (Original) The method of claim 17 including the forming at least three acid rings with each acid ring having at least two circumferential lips.

19. (Currently Amended) The method of claim 9 ~~die casting a battery terminal by including the step of~~ flowing molten metal into a cavity formed by a radially movable side mold members and axially displaceable end mold members.

20. (Original) The method of claim 9 including the step of applying a radially compressive force sufficiently to flare the lip and form a sealing bead thereon but insufficient to bend the lip into a hook.

21. (Original) The method of claim 10 wherein the battery terminal is placed in a collet having a radius of curvature substantially the same as the radius of curvature of the acid ring and the collet is collapsed to radially compress the lip to form a sealing bead on the lateral surface of the lip.

22. (Withdrawn) A lead or lead alloy battery part having:
an acid ring;
a lip located on the acid ring;
a lateral face on the acid ring;
an angled end face on the acid ring with the angled end face having an apex region proximate the lateral face so that a force on the angled end face flares the lip to form a container sealing bead on the lateral face of the acid ring.

23. (Withdrawn) The battery part of claim 22 wherein the battery part comprises a battery terminal.

24. (Withdrawn) The battery part of claim 22 wherein the battery part includes a plurality of lips.

25. (Withdrawn) The battery part of claim 22 wherein the battery part includes a further angled end face with the further angled end face coacting with the angled end face to form a valley in the end face of the acid ring.

26. (Withdrawn) The battery part of claim 22 wherein the acid ring has a circular shape.

27. (Withdrawn) The battery part of claim 22 wherein the lip in an unflared condition has an apex and wherein in a flared condition the lip has a an extended surface.